System for Reporting Client Status Information to Communications-Center Agents

by inventor
Stefaan Valere Albert Coussement

Field of the Invention

The present invention is in the field of telecommunication encompassing all existing sorts of interaction multimedia technology, and pertains more particularly to a system for reporting active client status information to communications-center agents.

Cross-Reference to Related Documents

The present invention is a continuation-in-part (CIP) to a US patent application S/N 09/710,042 entitled "*A **System for Improved Reporting of Communication Center Presence Information to Prospective Clients***", filed on 11/08/2000, disclosure of which is incorporated herein in its entirety by reference.

Background of the Invention

In the field of telephony communication, there have been many improvements in technology over the years that have contributed to more efficient use of telephone communication within hosted call-center environments. Most of these improvements involve integrating the

telephones and switching systems in such call centers with computer hardware and software adapted for, among other things, better routing of telephone calls, faster delivery of telephone calls and associated information, and improved service with regard to client satisfaction. Such computer-enhanced telephony is known in the art as computer-telephony integration (CTI). Generally speaking, CTI implementations of various design and purpose are implemented both within individual call-centers and, in some cases, at the telephone network level. For example, processors running CTI software applications may be linked to telephone switches, service control points (SCP), and network entry points within a public or private telephone network. At the call-center level, CTI-enhanced processors, data servers, transaction servers, and the like, are linked to telephone switches and, in some cases, to similar CTI hardware at the network level, often by a dedicated digital link. CTI processors and other hardware within a call-center is commonly referred to as customer premises equipment (CPE). It is the CTI processor and application software in such centers that provides computer enhancement to a call center.

In a CTI-enhanced call center, telephones at agent stations are connected to a central telephony switching apparatus, such as an automatic call distributor (ACD) switch or a private branch exchange (PBX). The agent stations may also be equipped with computer terminals such as personal computer/video display units (PC/VDU) so that agents manning such stations may have access to stored data as well as being linked to incoming callers by telephone equipment. Such stations may be interconnected through the PC/VDU by a local area network (LAN). One or more data or transaction servers may also be connected to the LAN that interconnects agent stations. The LAN is, in turn, typically connected to the

CTI processor, which is connected to the call switching apparatus of the call center.

When a call arrives at a call center, whether or not the call has been pre-processed at an SCP, typically at least the telephone number of the calling line is made available to the receiving switch at the call center by the network provider. This service is available by most networks as caller-ID information in one of several formats such as Automatic Number Identification (ANI). Typically the number called is also available through a service such as Dialed Number Identification Service (DNIS). If the call center is computer-enhanced (CTI), the phone number of the calling party may be used as a key to access additional information from a customer information system (CIS) database at a server on the network that connects the agent workstations. In this manner information pertinent to a call may be provided to an agent, often as a screen pop on the agent's PCNVDU.

In recent years, advances in computer technology, telephony equipment, and infrastructure have provided many opportunities for improving telephone service in publicly switched and private telephone intelligent networks. Similarly, development of a separate information and data network known as the Internet, together with advances in computer hardware and software have led to a new multimedia telephone system known in the art by several names. In this new systemology, telephone calls are simulated by multimedia computer equipment, and data, such as audio data, is transmitted over data networks as data packets. In this system the broad term used to describe such computer-simulated telephony is Data Network Telephony (DNT).

For purposes of nomenclature and definition, the inventors wish to distinguish clearly between what might be called conventional telephony, which is the telephone service enjoyed by nearly all citizens through local

telephone companies and several long-distance telephone network providers, and what has been described herein as computer-simulated telephony or data-network telephony. The conventional systems are referred to herein as Connection-Oriented Switched-Telephony (COST) systems, CTI enhanced or not.

COST telephony is not limited to wired, or land-line systems, but may include wireless network systems as well. The purpose of the definitions here is to distinguish clearly between data-packet systems, which share available bandwidth, and non-packet systems which use dedicated connections or channels.

The computer-simulated, or DNT systems are familiar to those who use and understand computers and data-network systems. Perhaps the best example of DNT is telephone service provided over the Internet, which will be referred to herein as Internet Protocol Network Telephony (IPNT), by far the most extensive, but still a subset of DNT. DNT systems may also include wireless sub-systems.

Both systems use signals transmitted over network links. In fact, connection to data networks for DNT such as IPNT is typically accomplished over local telephone lines, used to reach points in the network such as an Internet Service Provider (ISP). The definitive difference is that COST telephony may be considered to be connection-oriented telephony. In the COST system, calls are placed and connected by a specific dedicated path, and the connection path is maintained over the time of the call. Bandwidth is basically assured. Other calls and data do not share a connected channel path in a COST system. A DNT system, on the other hand, is not dedicated or connection-oriented. That is, data, including audio data, is prepared, sent, and received as data packets over a data-network.

The data packets share network links, and may travel by varied and variable paths.

Recent improvements to available technologies associated with the transmission and reception of data packets during real-time DNT communication have enabled companies to successfully add DNT, principally IPNT, capabilities to existing CTI call centers. Such improvements, as described herein and known-to the inventor, include methods for guaranteeing available bandwidth or quality of service (QOS) for a transaction, improved mechanisms for organizing, coding, compressing, and carrying data more efficiently using less bandwidth, and methods and apparatus for intelligently replacing lost data via using voice supplementation methods and enhanced buffering capabilities.

In addition to Internet protocol (IPNT) calls, a DNT center may also share other forms of media with customers accessing the system through their computers. E-mails, video mails, fax, file share, file transfer, video calls, and so forth are some of the other forms of media, which may be used. This capability of handling varied media leads to the term multimedia communications center. A multimedia communications center may be a combination CTI and DNT center, or may be a DNT center capable of receiving COST calls and converting them to a digital DNT format. The term communication center will replace the term call center hereinafter in this specification when referring to multi-media capabilities.

In typical communication centers, DNT is accomplished by Internet connection and IPNT calls. For this reason, IPNT and the Internet will be used in examples to follow. IT should be understood, however, that this usage is exemplary, and not limiting.

In systems known to the inventors, incoming IPNT calls are processed and routed within an IPNT-capable communication center in

much the same way as COST calls are routed in a CTI-enhanced call-center, using similar or identical routing rules, waiting queues, and so on, aside from the fact that there are two separate networks involved. Communication centers having both CTI and IPNT capability utilize LAN-connected agent-stations with each station having a telephony-switch-connected headset or phone, and a PC connected, in most cases via LAN, to the network carrying the IPNT calls. Therefore, in most cases, IPNT calls are routed to the agent's PC while conventional telephony calls are routed to the agent's conventional telephone or headset. Typically separate lines and equipment must be implemented for each type of call weather COST or IPNT.

Due in part to added costs associated with additional equipment, lines, and data ports that are needed to add IPNT capability to a CTI-enhanced call-center, companies are currently experimenting with various forms of integration between the older COST system and the newer IPNT system. For example, by enhancing data servers, interactive voice response units (IVR), agent-connecting networks, and so on, with the capability of conforming to Internet protocol, call data arriving from either network may be integrated requiring less equipment and lines to facilitate processing, storage, and transfer of data.

With many new communication products supporting various media types available to businesses and customers, a communication center must add significant application software to accommodate the diversity. For example, e-mail programs have differing parameters than do IP applications. IP applications are different regarding protocol than COST calls, and so on. Separate routing systems and/or software components are needed for routing e-mails, IP calls, COST calls, file sharing, etc. Agents must then be trained in the use of a variety of applications supporting the different types of media.

Keeping contact histories, reporting statistics, creating routing rules and the like becomes more complex as newer types of media are added to communication center capability. Additional hardware implementations such as servers, processors, etc. are generally required to aid full multimedia communication and reporting. Therefore, it is desirable that interactions of all multimedia sorts be analyzed, recorded, and routed according to enterprise (business) rules in a manner that provides seamless integration between media types and application types, thereby allowing agents to respond intelligently and efficiently to customer queries and problems.

One challenge that is ever present in a communications center is the ability to communicate current communication center status to customers attempting to reach the center for service. Older call-centers relying on COST communication techniques simply play recorded messages, the recordings informing the customers of the status of an agent being called. More advanced communication centers, including multimedia centers, have more extensive automated services in place for interacting with customers in the event that no agents are available. Most of these services are IVR driven and inform callers of options, as well as status of those persons the callers are attempting to connect with.

Estimated call-waiting times may be determined during a call attempt and communicated to the caller through IVR interaction. The number of calls ahead of current calls may also be provided as status information. A customer must invest the time and suffer the inconvenience of placing a call to the communication center in order to receive the status information. As described above, this information is made available through IVR interaction in prior art systems. In general, a call placed into the communications center must be paid for either by the customer placing the call, or by the center itself. It has occurred to the inventor that money and center resource could

be conserved by providing status information to customers without requiring a physical call to be placed to the center.

A network-based system known to the inventor enables users of the system to obtain current agent-status information related to agents of an information-source facility connected to the network before initiating contact with the agent or agents of the information-source facility. The system comprises a status-server node connected to the information-source facility (communication center) and to the network, an interface-server node connected to the status node and to the network, the status-server node accessible to the interface node, a user-operated network-capable appliance connected to the network, the interface node accessible to the network-capable appliance, and a software application distributed on at least the status and interface server nodes, the software application enabling distribution of the agent-status information to the user-operated appliance.

The user operating the network-capable appliance connects to the network and accesses the interfacing server node and requests the agent-status information, the agent-status information is then accessed from the status server node connected to the communication center by the interfacing server node and delivered to the requesting user over the operating network. Such a system saves phone costs for customers and/or agents as well as reduces utilization requirements of communication-center interface technologies such as IVR technology.

It has occurred to the inventor that in addition to enabling users to view status information and estimated waiting times associated with contacted agents, it would also be useful to enable agents to be able to view availability status and callback preferences of users.

What is clearly needed is a network-based system that allows agents operating from a connected information-source facility to monitor online

status of clients of the facility and to view real-time contact information concerning users who are in transition from one state to another. Such a system would enable agents to determine optimum time and method for initiating contact with patrons of the facility and save costs related to expensive out-bound calling systems and the like.

Summary of the Invention

In a preferred embodiment of the present invention, a network-based system is provided for enabling agent-users of the system to obtain current client-status information related to clients of an information-source facility connected to the network in order to optimize callback-connection success from the agent-users to the monitored clients. The system comprises, a first server node connected to the information-source facility and to the network, a second server node connected to the first server node and to the network, the second server node accessible to the first server node, a network-capable appliance connected to the network, the second server node accessible to the network-capable appliance, an agent workstation connected to the network and to the first server node, the first server node accessible to the agent workstation and a software application distributed on at least the first and second server nodes, the software application enabling distribution of the client-status information. The agent-user operating the agent workstation accesses the first server node and subscribes to the client-status information, the client-status information accessed from the second server node by the first server node and delivered to the requesting agent-user.

In a preferred embodiment, the system is implemented on the Internet network. In one aspect of the network-based system, the information-source

facility is a communication center marketing products and or services to the clients. In a preferred aspect, the agents are human resources employed by the communication center. In another aspect the agents are automated systems implemented at the communications center to provide specialized services.

In a preferred aspect, the client-status information includes online/off-line status of the client and the client's callback preferences including medium preferences and device preferences. In one aspect, an alert is propagated to clients, the alert indicating a time for callback and propagated at a predetermined time before the estimated time of callback. In another aspect, an alert is propagated to clients, the alert indicating the status of the communication center such as, but not limited to, the number of calls in queue and the estimated waiting time, enabling the client to plan or to initiate a call with higher probability of success. In a preferred aspect, the optional callback or alert mediums include cellular, IP, and wired communications mediums. In this aspect, the optional callback or alert devices include cellular telephones, pagers, telephones, computer stations, handheld computers, and laptop computers.

In one aspect of the system, client-status information automatically updates periodically. In another aspect, the client-status information is continually streamed to the subscribing agent-user.. Also in one aspect, the client-status information is pulled from the second server node by the first server node according to the subscribing agent-user's request. In another aspect, the client-status information is pushed to the first server node by the second server node and is available to be pulled by the agent-user operating from the agent workstation. In some aspects, the software application uses instant message technology in the transfer of client-status information. In other aspects, the software application uses streaming technology in the

transfer of client-status information. In still other aspects, the software application embeds the client -status information into a Web page subscribed to by the agent-user.

In one aspect of the system, the functions of the first and second server nodes are implemented within a single server node connected to the communications center, the network, and accessible to the network-capable appliance and to the agent workstation. In another aspect, the second server node is a third-party server node providing instant messaging services. In still another aspect, the second server node is hosted by the information-source facility and dedicated for agent-client communications. In still another aspect, the second server node functions as a call-waiting queue of the information-source facility.

According to another aspect of the present invention, a method is provided for enabling agent-users of an information-source facility connected to a network to obtain current client-status information related to clients of the information-source facility. The method comprises the steps of; (a) maintaining a client-interface server connected to the network and accessible to the information-source facility; (b) compiling and packaging the client-status information related to clients connected to the client interface and (c) serving the client-status information or a portion thereof to subscribing agent workstations over the network.

In a preferred embodiment, the method is practiced the Internet network. In one aspect of the method in step (a), the information-source facility is a communication center. In this aspect, the communication center markets products and or services to the clients. In another aspect of the method in step (a), the client-interface server is a third-party server hosting an instant messaging service. In a preferred aspect, the client-interface server is hosted by the communication center and dedicated for agent-client

communications. In still another aspect, the client-interface server is adapted as a call-waiting queue of the communication center.

In on application of the method, in step (b), the client-status information is packaged in the form of instant messages containing the information. In another application of the method, in step (b), the client-status information is embedded into an electronic information page served by the client-interface server. The method, in some embodiments, further comprises a step for alerting clients as to an estimated time of response from an agent in a callback situation or as to an estimated time of the communication center being available to receive a call. In this aspect, the alert is of the form of, but not limited to, one of a page to paging device, and instant message, an e-mail, or a telephone beep.

In a preferred aspect of the method in step (c) the agent workstation comprises a personal computer connected to a local-area-network (LAN). Also, in a preferred aspect, in step (c), the client-status information includes online/off-line status of the client and the client's callback preferences including medium preferences and device preferences. In this aspect, in step (c), the client-status information automatically updates periodically..

Now, for the first time, a network-based system that allows agents operating from a connected information-source facility to monitor online status of clients of the facility and to view real-time contact information concerning users who are in transition from one state to another is provided. Such a system enables agents to determine optimum time and method for initiating contact with patrons of the facility and saves costs related to expensive out-bound calling systems and the like.

Brief Description of the Drawing Figures

Fig. 1 is an overview of a communication network wherein reporting of communication-center presence information is practiced according to an embodiment of the present invention.

Fig. 2 is a plan view of a client-side media-interface containing status information according to an embodiment of the present invention.

Fig. 3 is a flow diagram illustrating client and system procedural steps for practicing communication-center presence reporting according to an embodiment of the present invention.

Fig. 4 is an overview of a communications network wherein agent monitoring of client status is practiced according to an embodiment of the present invention.

Fig. 5 is a logical connection diagram showing functionality and logical connection of principally software elements in an embodiment of the present invention.

Fig. 6 is a plan view of exemplary agent-side media-interfaces 99 and 101 containing availability status and callback parameters according to an embodiment of the present invention.

Fig. 7 is a flow diagram illustrating agent and system procedural steps for observing customer status and call back preferences according to an embodiment of the present invention.

Description of the Preferred Embodiments

In accordance with a preferred embodiment of the present invention, the inventor provides a novel software-hardware driven system for improving the reporting of communication-center presence information to prospective communication-center clients. The method and apparatus of the present invention is described in enabling detail below.

Fig. 1 is an overview of a communication network 52 wherein reporting of communication-center presence information is practiced according to an embodiment of the present invention. Communication network 52 comprises, in this example, a public-switched-telephone network (PSTN) 55, a data-packet-network (DPN) 61, a communication center 21, and an exemplary user 9.

PSTN 55, in this example, represents a preferred network connecting all connection-oriented-switched-telephony (COST) clients who call into communication center 21 for the purpose of doing business with the center. In another embodiment, a private telephone network may be utilized in place of or in combination with PSTN 55. The inventor chooses PSTN 55 because of its high public-access characteristic.

A local telephony switch (LSW) 59 is illustrated within PSTN 55 and represents automated switching capability within the network. LSW 59 may be an Automatic Call Distributor (ACD), a Public Branch Exchange (PBX), or any other type of telephony switching apparatus, in the broadest sense, including but not limited to DNT type switches/gateways as used in VoIP etc. LSW 59 is enhanced for computer-telephony-integration (CTI) by a CTI processor 62 connected thereto by a CTI connection. LSW 59 and CTI processor 62 may encompass various communication functionalities made available at network level by communication center 21. For example, an

instance of CTI software known to the inventor and termed Transaction Server (TS) is provided within CTI processor 62 and adapted to enable communication-center 21 to certain call-switching and routing aspects performed by LSW 59.

LSW 59 is connected to a central telephony switch (CSW) 53, illustrated within communication center 21, by a COST telephony trunk 57. CSW 53 may be any one of several types of call processing switches as previously described with respect to LSW 59 above.

CSW 53 is enhanced by a CTI processor 65, which is connected thereto by a CTI connection as was described with reference to LSW 59. CTI processor 65 also has an instance of TS software provided therein and adapted to communicate with TS software of processor 62. Processors 62 (network) and 65 (communication center) are connected by virtue of a separate data network 64 enabling the above-described communication between TS instances. By using network 64 to connect processor 62 and 65, communication center 21 may, in addition to controlling call switching and routing within PSTN 55, receive information about callers ahead of actual calls arriving at CSW 53 for internal processing. This enhancement is known as double-dipping by the inventors.

DPN 61 is, in this example, the well-known Internet network and will hereinafter be termed Internet 61. Internet 61 facilitates all Internet-protocol (IP) callers reaching communication center 21 through the Internet. Internet 61 may instead be a private or corporate Wide Area Network (WAN), or any other type of DPN as long as Internet communication protocols are supported. The inventor chooses Internet 61 as a preferred network because of it's high public-access characteristic. IP callers calling into communication center 21 may interface from any Internet-connected server, which provides network access to communication center 21. Moreover,

there may be many such servers distributed throughout network 61, each server being a point of access.

Internet 61 has an Internet backbone 13 illustrated therein. Backbone 13 represents all the lines, equipment, and connection points making up the Internet network as a whole, including sub networks. A Web Server (WS) 15 is provided within Internet 61 and is connected to backbone 13. WS 15 is adapted as an Internet file server as is known in the art. WS 15 represents one of a possible plurality of distributed customer-interfacing servers as described above. WS 15 serves electronic information pages, termed Web pages in the art, to requesting users. WS 15 is in this example hosted by the entity hosting communication center 21 and is utilized as a customer-interfacing server.

WS 15 is enhanced with a software instance termed Web-Presence-Software (WPS) 16, which enables prospective customers of communication-center 21 to view communication-center status related to agent availability for a call before deciding whether or not to actually place a call to communication center 21. More about WPS 16 is provided later in this specification.

An exemplary user, illustrated herein as a PC icon labeled with the element number 9, is connected to Internet backbone 13 by virtue of an Internet connection-line 11. User 9 is assumed, in this example, to be accessing WS 15 through standard Internet-connection capabilities as are known in the art. Typically, user 9 would obtain access to WS 15 through a dial-up connection utilizing an Internet-service-provider (ISP) and PSTN 55. However, there are many other means which may be used to obtain an Internet session with WS 15, many of which may not require dialing, e.g. DSL, cable modems etc. User 9 may utilize some other Internet-capable appliance than the PC illustrated herein. Likewise, connection line 11 may

be a wireless link, a cable-modem connection, or any other known Internet connection means.

An instance of software termed Customer-Presence-Software (CPS) 10 is provided to execute on customer-premise-equipment (CPE), which in this case is a PC operated by user 9. CPS 10 is adapted to integrate communication-center status information into a customer's electronic interface, which is typically an electronic-information-page (Web page) served to the customer by WS 15 upon the customer's request. CPS 10 is an optional implementation in this example and is described in more detail later in this specification.

Communication center 21 has an Internet Protocol Router (IPR) 25 illustrated therein and adapted to handle incoming communication events sourced from WS 15 or any other interfacing Web server over network connection 19. IPR 25 routes incoming events to agent workstations adapted to receive the events. Agent workstations 27, 29, and 31 are illustrated within communication center 21 and adapted for communication-center activity covering both IP and COST transactions.

Agent telephones 39 (workstation 27), 41 (workstation 29), and 37 (workstation 31) are provided to handle COST communication events. Telephones 39, 41, and 37 are connected to CSW 53 by internal telephony wiring 45. Each agent workstation 27, 29, and 31 has a personal computer/video-display unit (PC/VDU) provided therein and adapted for handling IP communication events and for receiving information about callers calling from PSTN 55. These are PC/VDU 33, PC/VDU 35, and PC/VDU 43 respectively.

PC/VDU's 39, 35, and 43 are connected to a Local-Area-Network (LAN) 23. LAN 23 is, in this case, enhanced for Internet communication. IPR 25 is connected to LAN 23 and functions as an event router as

previously described above. Other equipment may also be connected to LAN 23 such as a customer information server (CIS), a statistical server, and other communication-center systems and equipment not shown here but assumed to be present. Processor 65 is connected to LAN 23 by a LAN connection 67. In this way, information about COST callers being handled at LSW 59 may be routed over LAN 23 to destination PC/VDUs such as PC/VDU 35 in station 29 for example. Information about COST callers can also be handled by CSW 53 and routed over LAN 23 to destinations.

It will be apparent to one with skill in the art, that there may be many more workstations manned by communication-center agents than are illustrated in this embodiment without departing from the spirit and scope of the present invention. Similarly, there may be many more CTI functions represented herein without departing from the spirit and scope of the present invention. For example, IVR capability may be present at LSW 59, as well as at CSW 53. Automated systems such as automated fax systems and e-mail systems may also be present. There are many possibilities.

A status server 49 is provided within communication center 21 and adapted to monitor agent status and availability for receiving incoming communication events. Status server 49 is connected to LAN 23 by virtue of a LAN connection and monitors status at each workstation 27-31. Software used for this purpose is not illustrated in this embodiment, but may be assumed to be present and operational within server 49. Agents manning stations 27-31 may monitored as to how many calls are in their respective queues whether they are COST queues, IP queues, or virtual queues of either type. Estimated waiting times for each queue of each agent are determined using call-handling statistics available within center 21. The information gathered to be made available t users may also be more extensive in scope, involving status of groups of agents and the like. Server

49 is capable of monitoring the status of each agent in real-time, but for practical purposes, may perform periodic status checks on a frequent basis such that real-time parameters are closely emulated. All current status information for every agent logged on to LAN 23 is compiled by server 49 and maintained as long as it is current.

An instance of Communication-Center-Presence Software (CCPS) 50 is provided within server 49 and adapted to interface with agent-monitoring software per instance of client request initiated through WS 15. Status server 49 is, in this embodiment connected directly to WS 15 by a separate high-speed data link 20. This implementation is not specifically required to practice the present invention, however the presence of link 20 enhances server-to-server communication. In the absence of data link 20, all communication between WS 15 and status server 49 would be conducted over Internet connection line 19, through IPR 25, and over LAN 23.

In practice of the present invention in one preferred embodiment, user 9 accesses Internet 61 over Internet connection line 11 and logs into WS 15. WS 15 serves a Web page as a response to a request from user 9. The Web page requested is hosted by the entity hosting communication center 21 and therefore contains information about communication center 21 including contact links, product information, telephone numbers, and any other pertinent information that may be found on a customer interface. In addition to the more typical information contained in the Web page representing communication center 21, a Web form (not shown) is made available for the purpose of taking a user's status request before requiring the user to place an actual call or initiate any contact with center 21.

The Web form, which is part of WPS 16, allows a user to enter such information as a product description, profile information, or a purpose for the desired contact with communication center 21. WPS 16, upon receiving

and registering a request from user 9 sends an instant message/request over high-speed data link 20 to status server 49. CCPS 50 parses the request and obtains the most current status information from server 49 that matches the intent of the request. For example, if user 9 desires to purchase a four-wheel drive pickup, and communication center 21 is a car dealership, then CCPS 50 will only obtain status information connected to those agents within center 21 responsible for four-wheel drive sales.

Once status information is obtained by server 49, it is sent in the form of a response from server 49 to WS 15 whereupon it may be made available to user 9. In another embodiment, the status response may be sent to user 9 along with a subsequent Web page whereupon the information is caused to be a part of the web page at the location of user 9. In this case, CPS 10 would incorporate the information into the display of the subsequent Web page.

In still another embodiment, CCPS 50 may obtain all of the current agent-status information available from communication center 21 and send it to WS 15 over link 20 on a periodic or real-time basis. WPS 16 would, in this case, the enhanced with a filtering capability of filtering status information that closely matches a user request. Also in this case, an instant message would not need to be sent from WS 15 to status server 49.

In a simple embodiment, status information viewable by user 9 would include any listed agents, number of calls in their queues, and estimated time waiting for agent availability with respect to each queue. For example, agent JIM may have 5 COST calls waiting, 5 IP calls waiting, and 8 unanswered e-mails. Therefore, agent Jim may be considered unavailable for immediate service. An estimated time waiting for Jim to respond may be averaged over all his media types, or maybe specified for each media type. User 9 may initiate a refresh action in order to obtain an update of status information.

Contact links and other options may be presented in association with listed agents and agent status figures.

An interface of the type described above enables users to essentially browse agent-availability statistics before initiating any type of contact with communication center 21. In the event that a response message or downloaded interface reveals an available agent, user 9 could initiate contact with that agent using provided contact links or information.

It will be apparent to one with skill in the art that there are many configuration possibilities that exist with respect to reporting agent-availability status of agents within communication center 21 to requesting user 9 without departing from the spirit and scope of the present invention. Instant messaging or embedding the information into Web pages before or after download are techniques which may be employed to practice the present invention. Likewise, the status information may be made a part of a Web browser's tool bar or caused to open in an interactive window that pops up on a user's screen when the data is ready for display. In still another embodiment user station 9 may contact IPR 25 via connection 11, 13, 19 and retrieve pertinent information maintained through CCPS 50. This data may be displayed independently or integrated with a Web page from server 15. The functionality of WPS 16 at Web server 15 in retrieving information from communication center 21 via CCPS 50 is but a single example of how a system according to the present invention may function. It has been described that similar functionality may be provided by CPS 10 at a client station, and that there is no limitation to the client station operating only through a Web server. In a broad sense, the means of communication of client station 9 with communication center 21 is not limiting to the invention. The cooperation of gathering software (CCPS 50) at a communication center with an interface software (CPS 10) at a client station is novel.

In a further aspect, there are a variety of ways that the client stations in such a system may become enabled. In the system wherein retrieval of communication center status info is by software (WPS 16) at server 15, there is no need for additional software at the client station. A conventional browser will do. In the cases wherein software CPS 10 is enabled at a client station, that software may be sent to a client on a CD (for example), sent to the client in the background on accessing a Web page at server 15, downloaded intentionally by a client at station 9 as a plug-in to a Web browser, and in other ways as well.

Fig. 2 is a plan view of a client-side media-interface 69 that contains status information according to an embodiment of the present invention. Interface 69 is an exemplary representation of a customer interface displaying agent-availability status after it has been requested and delivered. Interface 69 may be an integrated part of a Web page (incl. e.g. script, Java, Java script, X-Windows script, plug-in etc. etc.), a pop-up information window, an instant message interface, or any other mechanism of computerized display.

In one embodiment, interface 69 is a product of CPS 10 of Fig. 1. In this embodiment, WPS 16 of Fig. 1 sends agent-availability information to user 9 over Internet connection 11, 13, 19, and CPS 10 incorporates information into an interactive display-window or into the actual Web page served by server 15. In another embodiment, interface 69 is a product of WPS 16 in Fig. 1 and is embedded into the actual Web page before it is served to user 9. In still another embodiment, interface 69 is a product of WPS 16 and is served to user 9 in the form of a standard instant-message interface using any of several known protocols.

In this basic example, agent-availability status is generalized to a group of agents and displayed as 3 parameters. These are a number of

available agents 71, a number of calls waiting 73, and an estimated hold time 75. In this case the information represents the most basic information available for the target group of agents. In this case there are 12 available agents that are handling the subject of request resulting in interface 69. There are 25 calls waiting in a queue shared by the 12 available agents. The average estimated hold time for one of the 12 agents to respond to an immediately placed call is 2 minutes and 10 seconds.

In this example, three interactive options are presented within interface 69, in this case, below the agent-availability information. A contact option 72 is provided to allow a viewing customer to initiate an IP-to-IP telephone call, or an IP-to-COST telephone call. A contact option 74 enables a viewing customer to send an e-mail, which would be routed to one of the 12 available agents. A contact option 76 enables a viewing customer to initiate a callback from one of the 12 available agents. Using callback option 76 enables an invoking user to be entered into a virtual queue. A user in this case may expect a callback at approximately 2 minutes and 10 seconds after initiating the contact. In actual practice, the availability and variety of interactive contact options is dependent upon enterprise rules and available media. One with skill in the art will recognize that there are many alternative display scenarios which may be used with interface 69.

In a more advanced case, interface 69 may contain much more detailed information including information that a specific to a user request invoking the interface. For example, each of the available agents 71 may be listed separately instead of collectively as illustrated herein. The number of calls waiting may be broken down to reflect the exact number of calls waiting for each available agent. Furthermore, estimated hold times may be determined individually for each busy agent. Likewise, additional information about agents may be listed such as skill levels, language

preferences, ranking within the organization, and so on. The level at which detailed agent-availability data may be compiled and presented depends entirely on the sophistication and configuration of agent monitoring software in use within communication center.

Fig. 3 is a flow diagram illustrating client and system procedural steps for practicing communication-center presence reporting according to an embodiment of the present invention. At step 77, the user logs onto a DPN, which in a preferred case, is the Internet network. At step 79, the user of step 77 navigates to a Web site hosted by a communication center that the user desires to contact. At this point, a Web form may be present on a main Web page of the Web site navigated to in step 79. Such a Web form would prompt a user for his or her intent or reason for the desired contact. These reasons are as wide-ranging as are enterprises that might host such a Web form. For example, a list of product descriptions may be presented for selection. Levels of contact priority may be established in the case of priority queuing, amongst others possibly based on user ID. Available options are limited only by enterprise rules.

At step 81, a user enters the information solicited from him or her by the above-described Web form. At step 83, the user submits the Web form. At step 84, a Web presence server analogous to Web server 15 of Fig. 1 receives the request sent by the user of step 83. At step 85, the Web presence server forwards the request received in step 84 to a communication-center presence server analogous to server 49 of Fig. 1.

At this point, software analogous to CCPS 50 of Fig. 1 analyzes the received request and pulls the most current agent-availability data for the purpose of servicing the request. At step 86, the applicable data is sent in the form of a response back to the Web presence server of step 85. It is noted herein, that this communication between servers may occur over a

separate high-speed data line as was described in reference to figure 1 above. Moreover, the server-to-server transaction may follow known request/response models used in Internet transactions.

When the applicable data is received at the Web presence server, software analogous to WPS 10 of Fig. 1 may integrate the information into a subsequent Web page to be sent back to the user of step 77, or it may formulate the response as an instant message, which is immediately dispatched act to user 77. At step 87 then, the applicable data is delivered to the user of step 77 and is displayed as an interactive interface analogous to interface 69 of Fig. 2 at step 89. At this point, the user of step 77 may initiate contact with the target communication center or wait for a better time for contact initiation based on user-analysis of the received data. It is also noted herein that the user requesting the data may refresh his or her request periodically to obtain the most current agent-availability data during a session period. In some cases, the requesting user may receive streaming data in real-time showing continual changes in agent-availability status over the time spent viewing the interface.

It will be apparent to one with skill in the art, that the customer/system process steps illustrated in this example may be altered in description and order without departing from the spirit and scope of the present invention. For example, the Web presence server of step 84 may have a local access to the most current agent-availability data at the instant of receiving a request. This was described an embodiment wherein agent-availability data from the target communication center is periodically pushed or continually streamed to the Web presence server. Moreover, the agent-availability data may be integrated into a Web page at server side or client side dependent upon software implementation. In one embodiment, the

entire transaction process from request to response and display is conducted using an instant message protocol.

The method and apparatus of the present invention may be practiced on the Internet, a private or corporate WAN or LAN network or in any combination thereof. Web server 15 of Fig. 1 may be hosted by a single communication center or shared by a plurality of communication centers. In the latter case, it is more likely that agent-availability data will be pulled from the providing communication centers rather than pushed to the central location.

Client-Status Monitoring Capabilities

In another aspect of the present invention an enhancement is provided that enables agents operating from within communications-centers to monitor client availability status for the purpose of callback optimization. In particular, in cases where the client has many media available, a collection of all media statuses is generated, and then presented as an amalgamated status to an agent or robotic agent. Additionally, the preferred mode and time for a back connection may be available as well.

In one aspect of the system, client on-/off-line status information and the client's callback preferences are obtained at the same time using the same protocol. In another aspect of the system, client on-/off-line status information and the client's callback preferences are obtained independently, for instance using a presence service such as ICQ™ for the on-/off-line status information and HTTP or WAP for obtaining the client's callback preferences, or for instance during a previous communication between the client and an agent of the communication center.

In one aspect of the system, client-status information is obtained from a single client terminal, such as a PC. In another aspect of the system, partial client-status information is obtained from multiple independent client terminals, such as a PC and a cellular phone, and combined to provide complete client-status information to the subscribing agent. In one aspect of the system, client on-/off-line status information is obtained concerning a single terminal device, such as a PC. In another aspect of the system, client on-/off-line status information is obtained concerning multiple independent terminal devices, such as a PC and a cellular phone, and combined to provide complete client on-/off-line status information.

In one aspect of the system, client-status information is obtained using a single protocol, such as ICQ™. In another aspect of the system, partial client-status information is obtained using multiple protocols, such as ICQ™ and MSN Messenger Service™, and combined to provide complete client-status information to the subscribing agent. In one aspect of the system, client-status information is obtained via a single network, such as the Internet network. In another aspect of the system, partial client-status information is obtained via multiple networks, such as the Internet network and the cellular network, and combined to provide complete client-status information to the subscribing agent. Fig. 4 is an overview of a communications network 92 wherein agent monitoring of client status is practiced according to an aspect of the present invention. Communication network 92 is somewhat analogous to communications network 52 of Fig. 1 above in terms of basic architecture and software implementation. Elements of network 52, which are not modified for the purpose of enabling the present invention are not re-introduced with new element numbers. Newly provided or modified elements used in the practice of the present invention are introduced herein having new element numbers.

Communication network 92 comprises PSTN 55, DPN 61, communication center 21, and an exemplary user 9 as described above with reference to network 52 of Fig. 1.

PSTN 55, as described in the example of Fig. 1, represents a preferred network connecting all connection-oriented-switched-telephony (COST) clients whom call into communication center 21 for the purpose of doing business with the center. In another case, a private telephone network may be utilized in place of or in combination with PSTN 55. The inventor chooses PSTN 55 because of its high public-access characteristic.

LSW 59, illustrated within PSTN 55 and represents automated switching capability within the network. LSW 59 may be an Automatic Call Distributor (ACD), a Public Branch Exchange (PBX), or any other type of telephony switching apparatus, in the broadest sense, including but not limited to DNT type switches/gateways as used in Voice over IP (VoIP) etc. as was previously described. LSW 59 is CTI enhanced by CTI processor 62 connected thereto by a CTI connection. TS software provided within CTI processor 62 enables communication center 21 to control certain call-switching and routing aspects performed by LSW 59 as was described in Fig. 1.

LSW 59 is connected to CSW 53, illustrated within communication center 21, by COST telephony trunk 57. CSW 53 may be any of several types of call processing switches as previously described with respect to LSW 59 above. CSW 53 is enhanced by CTI processor 65, which is connected thereto by a CTI connection as was described with reference to LSW 59. CTI processor 65 also has an instance of TS software provided therein and adapted to communicate with TS software of processor 62. Data network 64 provides a capability of *double dipping* described in Fig. 1 above. Internet 61 facilitates all Internet-protocol (IP) callers reaching

communication center 21 through the Internet. Internet 61 may be a private or corporate Wide Area Network (WAN), or any other type of DPN as long as Internet communication protocols are supported. The inventor chooses Internet 61 as a preferred network because of it's high public-access characteristic, as stated with reference to Fig. 1. IP callers calling into communication center 21 may interface from any Internet-connected server, which provides network access to communication center 21. Moreover, there may be many such servers distributed throughout network 61, each server being a point of access. Internet 61 is represented by Internet backbone 13, which represents all the lines, equipment, and connection points making up the Internet network as a whole, including sub networks.

Status server 49 is illustrated in this example as having a communication-center-presence-server CCPS 94 (software) installed therein, which is an enhanced version of CCPS 50 described in the example of Fig. 1. CCPS 94 not only provides clients with agent status information over the WWW, but also allows agents working within center 21 the capability of subscribing to client status information. More detail regarding the just-described enhancement is provided below.

In this example, there are 2 exemplary file servers illustrated as connected to Internet backbone 13. These are a customer presence server (CPS) 95 and a foreign presence server (FPS) 93. It is noted herein that CPS 95 effectively replaces WS 15 of Fig. 1 and can be assumed to provide the formerly-described functionality of server 15 and associated web presence server (WPS software) 16 of the same example. CPS 95 functions as a file server enhanced with an instance of software (SW) 97, which may be described, in this embodiment as CPS software 97. CPS server 95 is, in this example, hosted by the same entity hosting communication center 21 and is utilized as a customer/agent interface.

CPS SW 97 is enhanced for the purpose of allowing an agent to subscribe to real-time customer availability information as it applies to the remote station occupied by the customer. In this case, the station refers to remote PC 9, also referred to as user 9 in this specification. User 9 is connected to backbone 13 by Internet-access line 11, as was described with reference to Fig. 1. CPS 95 is optional in this example and not specifically required in order to practice the present invention. CPS 95 represents a collection server that is utilized for collecting and organizing user status-states, which may be subscribed to or otherwise accessed by agents of center 21.

FPS server 93 is adapted as a third-party server similar to those employed by well-known chat and instant messaging services. FPS 93 may be assumed to have software installed therein, and is adapted to organize instant communication between clients using a supported instant messaging service operating under a known protocol such as RFC2778 as was described in the example of Fig. 1. It is noted in this example, that CPS server 95 is connected to status server 49 within communication center 21 by high-speed data connection 20. A second high-speed data connection 19 is provided for connecting FPS server 93 to status server 49. In this respect, status server 49 has access capability to both CPS 95 and FPS 93. It is similarly noted herein, that high-speed data-access lines connecting server 49 to servers 95 and 93 are not required in order to practice the present invention. Server 49 may instead of adapted to connect to Internet backbone 13 using a 24X7 or a switched Internet connection.

In this embodiment, CPS 95 is hosted by center 21 and adapted to function in much the same way as FPS 93. That is to say that CPS 95 is a central facility for interaction. In one embodiment of the present invention, CPS 95 is not present and CPS SW 97 is instead distributed directly to client

machines, as in this case, CPS SW 97 illustrated as installed in PC 9. It is noted herein that the functionality of CPS 10 of Fig. 1 is included in the enhanced version, or CPS SW 97 shown on PC 9. In the absence of server 95, with client machines enhanced by SW 97, CCPS 94 interacts directly with the customer.

User 9 may be assumed, in this example, to be accessing either FPS 93, or CPS 95 for the purpose of determining agent status information as described in Fig. 1 and for making status information available to subscribing agents.

IPR 25 handles incoming message events sourced from FPS 93 and/or CPS 95. Other than enhanced functionality represented by server 49 running CCPS 94 and dual connection capability from server 49 to CPS 95 and FPS 93, communication center 21 operates identically to the center (21) described in Fig. 1 including the configuration of agent's workstations and so on. Therefore, detailed re-description of the agent's operating environment (workstations, LAN connectivity, etc) need not be provided in this example.

In one embodiment of the present invention, PC 9 has a known instant-messaging software application installed therein and adapted to use FPS 93 as a centralized communication server. An example of one such messaging service would be the well-known ICQ™service. In this case, CCPS 94 running on status server 49 is adapted to support the particular instant-messaging application employed by user 9 and supported at FPS 93. The instant-messaging application is, of course, assumed to be executing on the client machine, shown here as FPS-SW 97. For example, CCPS 94 may be adapted to recognize various descriptive states-of-activity represented at FPS 93 and associated with real-time communication states of connected users, in this case user 9. Examples of such states available through instant

messaging services include indications of whether user 9 may be off-line or online. Other status indications such as "user is away" or "do not disturb" may also be included as standard status indications available with known messaging services.

CCPS 94 may be adapted to integrate an enhanced package of status indicators associated with communication-center use into software running on FPS 93 and on user station 9 such that user station 9 may communicate a variety of enhanced status messages to subscribing agents within communication center 21. It is also noted herein, that the functionality of agent-status indication as taught in Fig. 1-3 above may be integrated into software at FPS 93 and at user station 9 without departing from the spirit and scope of the present invention. One example of an enhanced user-status indication that may be associated with communication center 21 may be an indication that user 9 is temporarily away and preferred contact is by cellular phone during this status period. Of course, the cellular phone number of user 9 would be provided as part of the indication. A communication-center agent, for example, an agent operating PC 43 within workstation 31 may subscribe to FPS 93 utilizing LAN 23, server 49, and high-speed data link 19.

In this case, the agent in question may be in various states of communication with a plurality of users connected to have FPS 93. According to a push model, user-status indications may be pushed in the form of periodic instant messages to PC 43, where they may be viewed by the monitoring agent. The monitoring agent may decide which contactor callback options are appropriate based on user-status indication contained within the content of the instant message. That may be done by other protocol than just IM, e.g. HTTP, WAP, IPNT etc.

According to a pull case, the agent operating PC 43 may subscribe to an interface (not shown) served by FPS 93 such that current status indications are contained within the interface and viewable on PC 43. In this embodiment, status server 49 executing CCPS 94 provides interactive interfaces for both clients and agents for the purpose of viewing status. Also in this embodiment, status server 49 executing CCPS 94 may facilitate COST outbound dialing from agent to client through CSW 53 by virtue of connection 51.

An agent operating at one of connected workstations 27-31 may subscribe to real-time status reports associated with a plurality of users connected to FPS 93. Subscription may be defined as an active state of dialog established between an agent and the connected users. The dialog states may be initiated and established by users contacting agents through the method of the present invention. Therefore, users who have connected to FPS 93 and have initiated contact with an agent of communication center 21 may be considered for status reporting until the purpose of the dialog is achieved or the user is no longer connected to FPS 93.

In some cases, the agent user will not be a human agent but will be a special purpose server (not shown) providing some very specific services. One example of such a special server is a callback server that automatically initiates callback calls to a customer 9 based on that user's callback preferences and routes the call to an agent after the customer answers. Another example of such a special purpose server is a server that monitors the communication center's status and, on request of the customer 9, sends an alert to the customer when the communication center's status matches specific conditions, for instance when the average waiting time is smaller than three minutes.

In a preferred embodiment, there can be multiple FPS and CPS servers in network 92. There can for instance be one FPS 93 for every third-party presence service that is being used in the communication center. There can be for instance an FPS 93 that is able to obtain the cellular on-/off-line status of the customer's mobile (not shown).

In another embodiment, the customer can have multiple terminal devices such as a PC 9 and a cellular phone (not shown). For each type of terminal equipment there can be a different FPS 93 to obtain the on-/off-line status of the customer. By combining these partial statuses (SW not shown), for instance in CCPS 94, a complete customer status can be presented to the subscribing agent. In one aspect, the CCPS 94 can combine the presence information of the customer. In another aspect, the customer's PC 9 can combine the presence information. Take for instance the case where the PC is equipped with a modem-board and where the customer's telephony is also connected to that same modem-board. In this case, the client's PC 9 can combine the client's on-/off-line status for the customer's fixed line and for the customer's internet access and his ability to participate in a chat session or a net-meeting, etc.

In some cases the agent doesn't necessarily have to subscribe for agent status info to the CPS or FPS, the CCPS could take over this job (e.g. agent doesn't use IMPP to subscribe but proprietary protocol). In the latter case the CCPS could subscribe to the CPS or FPS. Generally, it is better to have a call center node subscribe to all different types of CPS and FPS nodes, because there is a need or preference, to combine the customer status information from those different nodes into one presentation for the agent. In some other cases, this CCPS functionality could run on a dedicated node, could be combined with other functionality on a separate node (e.g.

embedding the status information in web-page), could run on the agents workstation (or node in case of automated agent), etc.

In another aspect of the present invention, CPS 95 executing CPS SW 97 functions as a status broker in much the same way as FPS 93. The exception being that CPS 95 is provided as a dedicated customer interface for the sole purpose of communication with communication center 21. In this aspect, the instant messaging application, SW 97, is proprietary and contains all of the status options and communications options supported by center 21 and does not have to be integrated with an existing instant messaging service. Provision of CPS 95 executing CPS SW 97 enables an agent operating one of workstations 27-31 within center 21 to subscribe to a single interface containing real-time or periodically updated status reports concerning all of the connected users which may be in dialog with the agent. In one embodiment, instant messages may be propagated in a push model as described above, instead of having subscription to an interactive interface.

Although in many cases the agent will not be communicating synchronously with the customer while receiving these customer's status info, it is possible to allow that, for example in cases where both the agent and the client need to do something, while communicating as well.

As previously described above, CPS 95 is optional and is intended to represent the central "place of status exchange" between agents and users, including but not limited to requests, etc. for dialog. According to another embodiment of the present invention CPS SW 97 is distributed directly to client PC stations similar to PC 9 as illustrated herein. In this case, status server 49 executing CCPS 94 functions as an instant message broker (i.e. proxy) between agents operating workstations 27-31 and users represented herein as user 9. In this case user 9 would log into a web server analogous to web server 15 of Fig. 1 for the purpose of initiating contact with

communication center 21. Because and interfacing server is used to interface a plurality of users to communication center 21, both instant message type status reports and status reports contained with an electronic information pages (web pages) are possible.

In some cases, signaling may be sent over the IM protocol, although typically, the other media will provide their own protocol, which will be used respectively, such as H.323 or SIP for IPNT.

In still another embodiment, user 9 initiates direct contact to communication center 21 by virtue of a client-installed version of CPS SW 97, which would contain all of the appropriate contact mechanisms needed to effect IP-to-IP or IP-to-COST connections over the appropriate network paths to center 21. In this embodiment, server 49 executing CCPS 94 may still be used as an agent-interface server, to which agents operating stations 27-31 may subscribe to be in order to view current user status, including but not limited to IP-to-IP events. It is noted herein, that IP-to-COST events would arrive at communication center 21 after having been routed through PSTN 55 through an appropriate gateway. However, when such events arrive at CSW 53 for internal routing, a channel may be opened from server 49 to the node, which is in this case PC 9, from which the incoming event originated if the addressing information is included in the arriving COST event. In this scenario, an agent may interact with a user from a COST telephone and view that user's status information simultaneously. If for some reason the agent must terminate the call, the agent may still subscribe user's online status through the connection established to PC 9 by server 49. Even though there is no active communication between the contacted agent and the initiating user status regarding connectivity state, callback instructions, and so on is immediately available to the contacted agent. Similarly, agent availability and estimated time of response reports

associated with the contacted agent are available to user 9 as long as the connection between user 9 and server 49 is open.

In another embodiment, the on-/off-line status information for user 9 will reach the communication center 21 independently from the callback preference information for that user 9. In one aspect, user 9 can be invited to fill out some form on a web page in order to specify callback preferences. In still another aspect, an agent can be feeding the customer preferences to the system during a communication with that customer 9. In these aspects, the callback preference information can be combined with the on-/off-line status information. In one aspect, the web page can be accessed by the customer using a PC. In another aspect, the web page can be accessed using a mobile device that is for instance WAP enabled. In one aspect, the web-page can be hosted by the FPS 93 or the CPS 95. In another aspect, it can be hosted by another server (not shown).

In still another embodiment, the customer's preferred third-party presence service can be part of the callback preferences. There are many third-party presence services such as, but not limited to, ICQ™ and MSN Messenger Service™. A user 9 that is a member of one these presence services, can allow agents of the communication center to monitor it's presence status by communicating it's preferred presence service to the communication center. In an aspect of the invention a customer that isn't a member of a third-party presence service can be allowed by the communication center to download the tools for a communication center specific presence service.

Fig. 5 is a simplified logical connection diagram illustrating functionality of principally software elements in an embodiment of the present invention. In Fig. 5 CCPS 119 is illustrated as operable in a communication center 117 for receiving status from client devices and other

information to be provided to agents. As described above, the agents may be live agents or robotic agents.

In Fig. 5 there are two clients (persons) labeled Client 1 and Client 2. There are four client devices 129, 133, 137, and 125, shown in Fig. 5. Client 1 has a PC 129 at his home, which executes an instance of FPS-SW 131, which is, in this case, AOL. Client 1 also has a PC 137 at his office executing an instance of CPS-SW 195. CPS-SW 139 is provided by the host of communication center 117. Further, Client 1 has a WAP telephone 125 executing an instance of FPS-SW 127, provided by Sprint in this example. Lastly there is a second client (Client 2) operating a PC 133, the PC executing an instance of FPS-SW 135, in this example also AOL.

A first Foreign Presence Service Server (FPSS) 121 monitors both instances of AOL (and any other instances at client premises not shown), and provides presence information to CCPS 119, which is enabled for AOL and is executing in communication center 117. A second FPSS 123 monitors WAP telephone 123. CCPS 119 monitors CPS-SW 139 executing on PC 137, although alternatively, there may be an intermediate Client Presence Service Server between PC 137 and CCPS 119, not shown here. Furthermore, in some cases additional servers maybe inserted as proxies etc. between for example FPSS 121,123 and CPSS 119 etc., not shown here.

It may be assumed, for example, that Client 1 in Fig. 5 may move between his PCs and carry his WAP telephone with him, being variously connected and available through the three client devices 125, 129, and 137. Real time monitoring of all of these devices by CCPS 119 directly and through FPSS instances provides valuable information to a real or robotic agent associated with Center 117, together with client preference information which may be achieved by any of several paths, as described above, in real time or according to pre-programmed preferences. The ability

of agents, real or robotic, to respond to client's needs is therefore greatly enhanced. The skilled artisan will recognize that both Fig. 4 and Fig. 5 are greatly simplified illustrations, and there may be many more clients, client devices, and instances of FPS and CPS servers and software involved in many ways. The diagrams and accompanying descriptions are provided to convey the essentials of the invention and its functionality.

It will be apparent to one with skill in the art, that the method and apparatus of the present invention may be applied to a variety of connection scenarios without departing from the spirit and scope of the present invention. Similarly, the software of the present invention may be provided in a variety of functionalities ranging from an extendable application program interface (API) to an existing instant-messaging service to a fully functional server-driven service application including client-side and server-side components.

It will also be apparent to one with skill in the art, that instant messages following standard instant message protocol can be sent back and forth between subscribing agents and clients without departing from the spirit and scope the present invention. In addition to instant messaging, status alerts may take the form of pager messages or other types of known alerts when a client status is determined to be off-line.

Fig. 6 is a plan view of an exemplary agent-side media-interfaces 99 and 101 containing availability status and callback parameters according to an embodiment of the present invention. Interface 99 may take the form of instant message, a messaging window integrated into an electronic information page (web page), or any other graphics interface that may be propagated over network lines to subscribing devices. In this simple example, Joe Customer has a status of ONLINE and the requested callback

medium of voice over Internet protocol (VoIP). Other callback mediums listed in interface 99 include a COST medium and a Pager medium.

In a one case, an agent subscribes to the status of Joe Customer during a dialog session typically initiated by Joe Customer. Interface 101 is analogous informed to interface 99 with the exception that the indicated status is OFFLINE. The status depicted in interface 101 is an indication to a subscribing agent that Joe is no longer connected to an interfacing server on the network. If Joe is connected to the network but no activity is recognized for a predetermined period of time, Joe's status may be determined to be AWAY. In this example, interface 101 depicts a pager medium as a preferred callback option.

In another case of the invention, a single agent may subscribe to a plurality of customer status messages simultaneously such that he or she may manage outbound calling in a more optimal fashion. Moreover, because the messaging is bi-directional Joe may receive alerts or messages indicating estimated waiting time for a callback, or perhaps instant message data that resolves the current dialog between Joe and an agent. In the latter case, instant messaging may be used to dispose of calls.

Fig. 7 is a flow diagram illustrating agent and system procedural steps for observing customer status and call back preferences according to an embodiment of the present invention. At step 107, a communication-center agent subscribes to customer presences server 95 of Fig. 4, in this case, through status server 49 within communication center 21 described in Fig. 4. It is assumed in this step that the subscribing agent already has at least one customer who has initiated contact with the subscribing agent through server 95. It may be that the subscribing agent is working with a plurality of customers also connected to server 95.

At step 109, the subscribing agent is served one or more instant messages containing customer status information. In one embodiment, a single interface such as a web page containing status data categorized for each customer the agent is working with is served at step 109. In this case, status information related to each customer the agent is subscribing to may be contained in separate windows or lists available within interface. In another embodiment, the subscribing agent may select a customer and receive an instant message regarding that customer's status.

At step 111, the subscribing agent observes the customers status relating to whether the customer it is online or off-line. At step 113, the subscribing agent observes the customer's call back preferences, which may very according to the customer's connection status. Call back preferences may include but are not limited to IP phone, cellular, e-mail, pager, COST telephone, interactive chat, and so on. At step 115, the subscribing agent takes action based on the customer's status and stated call back preferences.

In one case of the invention, CPS 95 may be facilitated as sort of a callback queue wherein a plurality of the agent's customers may be directed to if the agent of contact happened to be busy at the time of contact. During the period of waiting, customer status and call back preferences are propagated to the subscribing agent and estimated times of response and other information they be propagated to the waiting customers. Flexibility exists in this embodiment in that unlike any normal call-waiting queue, the customer is free to move about and even disconnect from the network and go about normal business while waiting for a callback.

In the case of a customer terminating his connection with server 95, the subscribing agent will be served an instant message reflecting the customer's off-line status and a medium wherein the agent may contact the

customer off-line such as a COST telephone, a pager, or some other off-line medium.

In another case of the invention, a priority state may be applied to the plurality of customers waiting for a response from a particular agent. In this embodiment, the customers may subscribe to estimated-waiting time alerts regardless of whether they are online or off-line. For example, a customer may indicate that an alert be sent to his or her paging device approximately five minutes before an agent is estimated to respond by calling the customer on his or her cell phone the event that the customer has gone off-line from the interfacing server. The subscribing agent is served the off-line status, which includes the preferred call back medium and the appropriate cell phone number to call. The page alert to the customer they be propagated by the interfacing server if the server is equipped with outbound dialing capability into a telephony network. In this case the server has the communication-center status information of the agent including the estimated times for the agent to handle his or her calls in queue.

The method and apparatus of the present invention may be practiced over a communications network comprising any combination of Data-Packet, COST, and wireless networks utilizing appropriate gateways without departing from the spirit and scope of the present invention. Moreover, many variations of customer states and agent states may be included as options for configuration into the software the present invention. For example, a client may configure as many devices into the system as desired for enabling agent callbacks under a variety of circumstances. Similarly, an agent may subscribe singularly or in a plural sense to specific customer states.

In still another case of the invention, a central server such as CPS 95 of Fig. 4 may be dedicated to communication-center 21 such that all

interfacing customers have status interfaces which are available to all subscribing agents. In this case, subscribing agent may browse and subscribe to selected customer states based on agent/customer match-up. For example, a subscribing agent specializing home loans for example, may log into the system and subscribe to any customers connected the system who have initiated an inquiry to communication center 21 regarding loans. There are many variant possibilities.

The method and apparatus of the present invention encompasses the wide range of varying implementations and therefore should be afforded the broadest scope under examination. The spirit and scope of the present invention is limited only by the claims that follow.